National Park Service
U.S. Department of the Interior

Haleakalā National Park
Hawaii

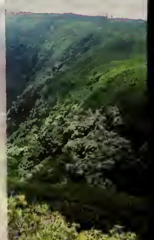
Haleakala
Official Map and Guide

Eric Nishibayashi

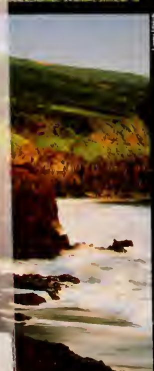
The distinctive cinder cones that dot the summit landscape of Haleakalā resulted from relatively recent eruptions. Material from these mildly explosive, fountaining eruptions settled back around the vent forming the cones. Only a few plants, birds, and insects have adapted to the harsh conditions created at the summit and on the upper slopes of the volcano. 'Āhinahina (silverswords) have shallow root systems that allow them to catch moisture in the porous, loose cinders and long tap roots that anchor the plants in high wind. The dense covering of silvery hairs on the leaves helps to conserve moisture and protect the plants from the intense high elevation sun.

Jack Jeffrey

The long, curved bill of the 'i'iwi, a rain forest honeycreeper, is ideally adapted to sipping nectar from the tubular flowers of Hawaiian lobelias. As lobelia species have declined due to deforestation and the introduction of grazing and browsing animals, the 'i'iwi is often found feeding on the smaller flowers of the 'ōhi'a (shown). Other species have not been so successful in adapting to the rapid changes brought on by humans. Eighty-five species of Hawaiian birds have become extinct and 32 are on the Federal Endangered Species List, with seven of these possibly already extinct or on the brink. The extinction crisis is real. We can't take back what has been done, but what we do now is important.



The trail leading from Kīpahulu Ranger Station/Visitor Center to 400-foot Waimoku Falls winds for 1.83 miles through a forest of non-native plants such as bamboo, mango, and guava. Further up the valley, above 1,000 feet, the Kīpahulu Valley Biological Reserve protects one of the last intact native rain forest ecosystems left in the Hawaiian Islands. To help preserve this fragile, pristine environment, the reserve is closed to public entry as researchers and managers study this little-known system and attempt to control the encroachment of non-native species.



Larry Ulrich

Countless times over hundreds of thousands of years, hot lava met the ocean amidst clouds of steam. Each time the island grew a little larger. Today, sharks, octopi, green sea turtles, humpback whales (in winter only), and fish inhabit the coastal waters of Kīpahulu. Many of the native stream dwellers in the Hawaiian Islands were originally ocean species that over time adapted to live in freshwater. The 'o'opu (gobies), bottom fish with frog-like faces, spend their adult lives in streams. After the adults spawn, the eggs are washed out to sea. As hatchlings, the young 'o'opu migrate back up to the freshwater pools where they began their lives. Suction cups (actually fused fins) on their bellies aid the 'o'opu in their upstream journey.

The most isolated major island group on earth, the Hawaiian archipelago is 2,400 miles from the nearest continent. The chain reaches from the Big Island of Hawai'i (at about the same latitude as Mexico City) to Kure Atoll 1500 miles to the northwest and is still growing. For at least 81 million years, new islands have been forming as the Pacific Plate moves northwestward over a stationary plume of magma rising from a "hot spot" within the earth's mantle. The fluid rock makes its way up through the ocean floor and countless eruptions over hundreds of thousands of years eventually create a high volcanic island. But the plate's unceasing movement slowly separates the volcano from its source, terminating its growth even as a new volcano rises from the ocean floor over the hot spot. The volcano that formed East Maui, part of which lies within the boundaries of the national park, last erupted about two centuries ago.

Across vast expanses of ocean, life eventually came to Maui and the other islands in the form of seeds, spores, insects, spiders, birds, and small plants. They drifted on the wind, floated on ocean currents, or hitched a ride on migrating or storm-driven birds. Many groups of organisms (amphibians, reptiles, social insects, and all land mammals except earlier ancestors of the monk seal and of bats) were unable to make the long journey, while some arrived but did not survive in their new home. It is estimated that an average of only one species every 35,000 years successfully colonized the islands.

The survivors found themselves in a land of vast opportunity. The Hawaiian Islands are a mosaic of habitats, from rain forest to alpine, often in close proximity. In the surrounding ocean, rainfall averages 25-30 inches annually. Yet Maui and the other islands, trapping moist trade winds, receive rainfall ranging from more than 400 inches annually on the windward side of the mountains to less than 10 inches on the leeward side. Average temperatures range from 75°F at sea level to 40°F at the summit of the highest volcanoes. Isolated by the sea, these mountains have created an extremely diverse environment in a small area.

The colonizers gradually adapted to the environment of the islands and to life without the predators and competitors of their homelands. Eventually most evolved into entirely new (and often defenseless) species found nowhere else in the world. The roughly 10,000 native species of flora end fauna of the Hawaiian Islands are thought to have evolved from about 2,000 colonizing ancestral species.

The isolation which has made the plants and animals of the Hawaiian Islands unique also makes them vulnerable to the rapid changes brought on by humans. Hawaiian species often cope poorly with habitat alterations, foreign diseases, predation, and competition from introduced species. (Today about 20 alien species are introduced to the islands every year.) Thus active intervention by conservation managers has become essential to the survival of the natural heritage of Hawaii.

Drawing by Vicki Vierra

By adapting to a wide variety of food sources and habitats through the process of **adaptive radiation**, a single finch-like ancestor from the Americas gave rise to an estimated 52 species of Hawaiian honeycreepers. The slightly curved bill of the 'ākohekohe is ideal for feeding on the nectar of native flowers. Strategies for feeding on insects resulted in other bill shapes: the 'akialoa (probably extinct) foraged among leaves and branches; the 'alauahio feeds on insect larvae and nectar of 'ōhi'a and lobelia flowers; and the Maui parrotbill crushes twigs to find prey.

Endemic species evolved in the Hawaiian Islands from ancestral colonizers and are unique to a specific area. The Haleakalā 'āhinahina is a silversword endemic to the upper slopes of Haleakalā. This 'āhinahina grows as a compact rosette of narrow silvery leaves for up to 50 years before finally flowering. After flowering once in its lifetime, the plant dies. The endemic insects which pollinate the Haleakalā 'āhinahina are essential to the long-term survival of these fragile plants and are dependent on them for nourishment.

Foreign species of plants and animals introduced purposely or accidentally by humans are known as **aliens**. Alien species have reduced populations of native Hawaiian species and in some cases threaten their survival. Aggressive alien plants such as kāhili ginger can spread into remote forests, displacing native vegetation. Goats eliminate vegetation, resulting in severe erosion. Mongooses, originally brought to the Hawaiian Islands to control rats in sugar cane fields, prey on the eggs and young of ground-nesting birds.

The State of Hawaii comprises only two-tenths of a percent of the total U.S. land area, yet one-third of the plants and birds listed or considered for listing on the Federal Endangered Species List are Hawaiian. The impact of human activities on native species and ecosystems cannot be completely undone, but **active management** is limiting and even reversing some of the damage. Today's natural area managers build fences, control alien species, restore native vegetation, and work to increase our knowledge of Hawaiian ecosystems.

Diversity on Haleakalā

Found at the highest elevations, the **alpine/aeolian** zone appears barren. Rainfall sinks rapidly into the porous, rocky ground, whose bare surface becomes "summer every day, winter every night." Few plant species can establish seedlings in this harsh environment, and plant cover is sparse; only a few hardy shrubs, grasses, and the 'āhinahina (silversword) survive. Unique communities of insects and spiders thrive by feeding on wind-imported insects, other organic matter, and moisture from lower elevations.

The **subalpine shrubland** covers extensive areas below the alpine/aeolian zone and above the forest line. More than a dozen species of plants and grasses inhabit this zone, many found nowhere else on earth. Shrubs are sparse in the shallow soils at higher elevations, but form dense thickets where soils are deeper. The shrubs provide food for many bird species, including the nēnē (Hawaiian goose).

Rain forest occupies the windward slopes of Haleakalā. Annual rainfall ranges from 120 inches to 400 inches or more. The forest canopy is dominated by 'ōhi'a trees in the upper elevations, grading into a mixed 'ōhi'a and koa canopy at lower levels. Diverse vegetation—smaller trees, ferns, shrubs, and herbs—grows in the understory. One of the most intact rain forest ecosystems in Hawaii, the Kīpahulu Valley is home to numerous rare birds, insects, and spiders.

The **dry forest** zone is found on the leeward slopes of Haleakalā, in areas with 20 to 60 inches of annual rainfall. Dry forests may once have been more extensive than rain forests, but browsing animals, grass invasions, and fire have drastically reduced them. Small patches of dry forest are preserved in Kaupō Gap.

Cutting across several life zones, **stream** ecosystems hosting fish, shrimp, and limpets meet the **lowland/coastal** zone. These low elevation ecosystems have been more heavily modified by humans than any other life zone. Native shrubs and herbaceous plants remain only in pockets along the coast.

The Shaping of East Maui

Haleakalā is a shield volcano (one with gradually sloping sides). Though the large basin at its summit is commonly called a "crater," this label is misleading. A true crater is formed during volcanic activity. The geologic history of Haleakalā tells a different story.

Both East and West Maui began life as volcanic islands, built up from the ocean floor by countless eruptions of fluid lava. The volcano that formed East Maui emerged from the sea more than 800,000 years ago. Continuing eruptions, ending some 400,000 years ago, built a mountain (1) that rose several thousand feet higher than today's 10,023-foot summit. Water, wind, and possibly glaciers cut major valleys into opposite sides of the volcano. The amphitheater-like heads of Ke'anae

and Kaupō valleys slowly cut their way towards the summit (2), where they merged, forming a large basin (the "crater"). Later, new lava flows partially filled the basin. Numerous volcanic vents, called cinder cones, mark the younger eruptive sites.

The contest between volcanism and erosion continues today. The most recent volcanic

activity on Maui was in about 1790, when lava erupted near the coast at Makena. Based on this history, Haleakalā is classified as an active volcano. Meanwhile the sea pounds at the shore, streams and waterfalls continue to carve away the mountain. The volcano will one day be reclaimed by the sea.

Background illustration by [illegible]

Haleakala

Courtesy of Bishop Museum

Hawaiians adapted to some Western influences on dress and on architectural elements such as the Western door (see photo). At the same time they maintained their basic cultural identity and continued to live in extended families. This social unit remained intact for pursuing agricultural and cooperative fishing ventures and gathering materials. The hālau (long house) was the gathering place for many people. Buildings were usually thatched with pili grass, although other materials, including lauhala (pandanus leaves), were used. Being greeted with aloha and invited into a home to eat (*Ai'ai, a 'ai kākou*) is still a primary requisite of good manners in the Hawaiian Islands.

The coastal Kipahulu area once supported a large population of Hawaiians. Current estimates place several hundred thousand people in the Hawaiian Islands at the time of Captain Cook's arrival.

These people were skilled at fishing, farming, collecting, and craftwork. Management of their resources was based on Mālama 'Āina (caring for the land), an ideal still alive among Hawaiians today. Successful farming, fishing, and gathering depended also on the concepts of lōkahi (working together) and laulima (many hands). Lo'i kalo (taro patches), fishing shrines, hālau (temples), canoe ramps, and retaining walls are lasting reminders of these dynamic cultural ideals.

Hawaiians showed great skill in creating ingenious and beautiful practical items from stone, bone, wood, and shell. A broad range of tools and utensils such as poi pounders, fish hooks, octopus lures, and adzes were fashioned using only stone implements. The poi pounder was one of the most frequently used. Poi was prepared fresh daily by pounding cooked corms (underground stems) of the kalo plant and thinning with water to the desired consistency.

Fishing hook and line.

Squid lure: scrap shell and carved stone sinker.

Poi pounder for crushing kalo (taro) stems to produce poi.

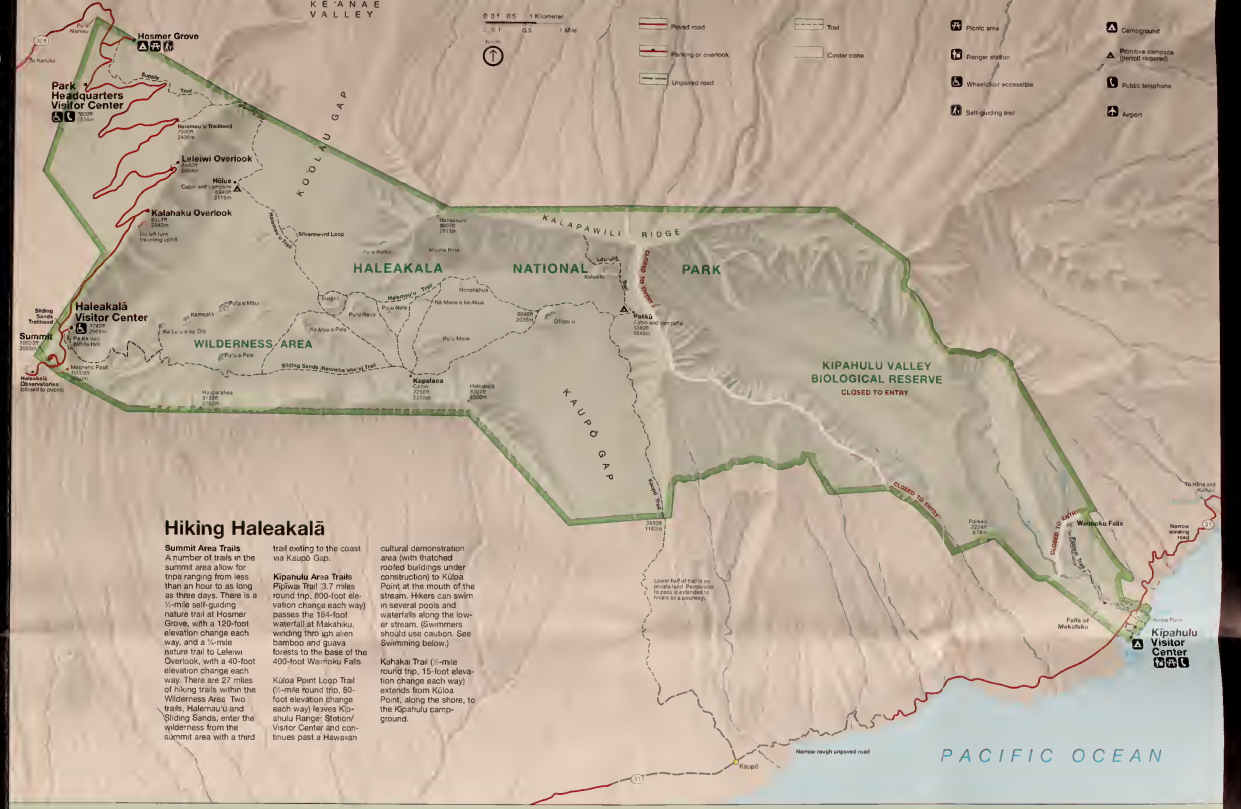
Agricultural practices in the Islands were carefully managed according to the rhythms of nature. Mahi'ai (farmers) specialized in growing crops such as kalo (ah-wn here) or 'uala (sweet potato). The Hawaiian calendar recommended planting based on the changes of a year-round growing season. As with much of Hawaiian life, respect for the spiritual realm was shown during every phase of planting and harvesting. Fundamental patterns of Hawaiian culture were based on the planting and growth cycle of this plant. The ohana (family) of 'ohana (the family) is derived from 'ōnohā, the sprout used to propagate kalo. The 'ohana worked together to build extensive irrigated terraces for the growing of more than 300 varieties of kalo.

Courtesy of Bishop Museum

Approximately 1,500 years ago, Polynesian colonists sailed large double-hulled canoes on migrational voyages from the South Pacific. They navigated over 2,500 miles of open ocean using nature's signs, such as stars, birds, winds, tides, and currents. To sustain themselves the Polynesians brought to the Hawaiian Islands food and medicinal plants, introducing kalo, 'uala (sweet potato), uhi (yams), 'ulu (breadfruit), and kō (sugar cane), as well as dogs, pigs, and chickens. Koa trees, found only in the Hawaiian Islands, provided logs for hulls of double- and single-hulled canoes. Single outrigger canoes (see photo) were mainly used by lawai'a (fishermen) to catch deepwater fish such as aku (bonito).

Adze used to shape canoes.

Artifacts courtesy of Hana Cultural Center



Hiking Haleakalā

Summit Area Trails A number of trails in the summit area allow for trips ranging from less than an hour to as long as three days. There is a ½-mile self-guiding nature trail at Hosmer Grove, with a 120-foot elevation change each way, and a ½-mile nature trail to Leleiwi Overlook, with a 40-foot elevation change each way. There are 27 miles of hiking trails within the Wilderness Area. Two trails, Halemau'u and Sliding Sands, enter the wilderness from the summit area with a third trail exiting to the coast via Kaupō Gap.

Kipahulu Area Trails *Pīpīwai* Trail (3.7 miles round trip, 800-foot elevation change each way) passes the 184-foot waterfall at Makahiku, winding thro igh alien bamboo and guava forests to the base of the 400-foot Waimoku Falls.

Kūloa Point Loop Trail (½-mile round trip, 80-foot elevation change each way) leaves Kipahulu Ranger Station/ Visitor Center and continues past a Hawaiian cultural demonstration area (with thatched roofed buildings under construction) to Kūloa Point at the mouth of the stream. Hikers can swim in several pools and waterfalls along the lower stream. (Swimmers should use caution. See Swimming below.)

Kahakai Trail (½-mile round trip, 15-foot elevation change each way) extends from Kūloa Point, along the shore, to the Kipahulu campground.

Exploring the Park

Visitors to the park can explore the summit area or the Kipahulu area on the coast. Park headquarters and the 10,023-foot summit can be reached from Kahului via Hawaii 37 to 377 to 378. Driving time to the summit from the resort areas of Kihei and Kā'anapali is about two hours. Kipahulu is reached via Hawaii 36 to 360 to 31. Driving time from the resort areas to Kipahulu is three to four hours.

Weather Weather and viewing conditions at the summit are unpredictable and can change rapidly. Be prepared for cold (30-50°F), wet, windy (10-40 mph) weather and intense sun. Sunrise is often clear, but expect crowds. Kipahulu is subtropical with light rain showers occurring any time of the year. Call 808-871-5054 for the forecast.

Driving Vehicles must remain on roads or in parking areas. Road hazards in and enroute to the park include steep turns, rocks, fog, rain, slippery pavement, cattle, bicyclists, large buses, and heavy traffic. When driving down from the summit of Haleakalā, use lower gears to prevent brake failure. Slower vehicles must use pullouts. If you have mechanical problems, move your vehicle out of traffic lanes while waiting for help.

Regulations and Safety Report accidents, violations, unusual incidents, or sightings of alien species to a ranger. Prohibited: hunting, firearms, roller blades, skate boards, disturbing any natural or cultural feature. Bicycles are restricted to paved roads and parking areas.

High altitude may complicate health conditions and cause breathing difficulties. Pregnant women, young children, and those with respiratory or heart conditions should consult their doctor regarding travel to high elevations. Turn back and seek medical aid if you have problems. The summit is about 30°F colder than the beaches. Weather conditions change rapidly. Hypothermia is a possibility any time of year.

Activities and Facilities Begin your visit by stopping at one of the visitor centers: Park Headquarters Visitor Center (7,000 feet) or Haleakalā Visitor Center (9,740 feet) in the summit area, or the Kipahulu Ranger Station/Visitor Center. An entrance fee is charged to enter the summit area. No food or gas is available in the park. No water is available at Kipahulu. Public phones are at park headquarters and the Kipahulu parking lot.

Ranger Programs Talks and hikes are offered regularly. Call or write for details. Groups may arrange special programs subject to staffing; call at least one month in advance.

Hiking Trails are rugged and strenuous. Hiking off designated trails and cutting switchbacks are prohibited; they cause erosion and unsightly scars which mar the scenery for years to come. Off-trail hikers can unknowingly crush the roots of native plants like the silversword and trample unique insect species living among the rock and cinder.

Wilderness Area water supplies are not potable; water should be treated before drinking. Use portable toilets where provided. If toilets are not available, bury waste and carry out paper—waste attracts alien ants which kill native species. There are no open fires permitted in the Wilderness Area. Sunscreen and plenty of water are essential.

Pets Pets must be physically restrained at all times and are not allowed on trails. Nēnē and other ground-nesting birds are vulnerable to harassment and predation.

Camping Drive-in campgrounds are available at Hosmer Grove and Kipahulu, on a first-come, first-served basis. No permit is required and no fee is charged. Grills, picnic tables, and restrooms are provided at both campgrounds. Hosmer Grove has water. NO water is available at Kipahulu. Fires are allowed only in the grills. Wilderness Area camping is allowed only at HōIua and Paliku. Required permits are free and available on a first-come, first-served basis at park headquarters on the day of the trip. At all campgrounds, stays are limited to three nights per month and group size is limited to 12 people.

Wilderness Area Cabins Three primitive cabins, accessible only by hiking or horseback, are in the Wilderness Area. Reservations are by lottery. Lottery applications must be received two months prior to the first day of the month in which a reservation is requested. Cabins are rented to one group of up to 12 people per night. Stays are limited to three nights per month.

Swimming Kipahulu streams are very dangerous at high water; the water can rise 4 feet in 10 minutes. People have lost their lives by ignoring warnings. Swimming is also not recommended when streams are stagnant and not flowing. Ocean swimming is not recommended due to high surf and currents.

Plants and Animals Remove seeds from boots, rain gear, and tents before entering the park. One of the greatest threats to native species is the introduction of alien plants, seeds, and animals. Although some species such as the nēnē (Hawaiian goose) act tame, they are wild. Do not feed nēnē or other wildlife. Feeding causes the animals to beg and endangers them as they approach moving vehicles.

Cultural Resources Do not disturb or alter any rock structures. Do not gather and stack rocks in ahu (piles) along roads and trails and at overlooks. Ahu built long ago by Hawaiians are important cultural artifacts and should not be imitated or destroyed.

Administration The park is part of the National Park System, one of more than 370 parks that are important examples of our nation's natural and cultural heritage. It is administered by the National Park Service, U.S. Department of the Interior. For more information about the park contact: Haleakala National Park, P.O. Box 369, Makawao, HI 96768; phone 808-572-9306; Internet **www.nps.gov/hale**

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